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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,901	04/19/2007	Georg Busch	3A001-010001	6294

69713 7590 02/18/2010
OCCHIUTI ROHLICEK & TSAO, LLP
10 FAWCETT STREET
CAMBRIDGE, MA 02138

EXAMINER

CAZAN, LIVIUS RADU

ART UNIT	PAPER NUMBER
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3729

NOTIFICATION DATE	DELIVERY MODE
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02/18/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/599,901	Applicant(s) BUSCH, GEORG	
	Examiner LIVIOUS R. CAZAN	Art Unit 3729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-10, 12-17, 19 and 26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-10, 12-17, 19 and 26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/21/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/21/2009 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 6-10, 12-17, 19, and 26** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In particular, claims 1, 13, and 26 recite the newly added limitation “wherein the lacquer is at least partly accomplished by means of screen printing.” This claim language is unclear (see rejection under 35 U.S.C. 112, 2nd paragraph, below), as it would appear to require forming lacquer by screen printing. The disclosure provides no support for this limitation. The through-connections are filled with the lacquer by means of screen printing, i.e.

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lacquering is accomplished by screen printing, but the lacquer itself is not disclosed to be accomplished (i.e. formed) through such a method.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 6-10, 12-17, 19, and 26** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. In particular, independent claims 6, 13, and 26 recite the newly added limitation "wherein the lacquer is at least partly accomplished by means of screen printing." See the above rejection under 35 U.S.C. 112, 2nd paragraph. The lacquer is the material filled into the bores. It is unclear how the lacquer itself can be accomplished (i.e. formed) by screen printing. It is believed the claims were intended to recite --wherein the filling is at least partly accomplished by means of screen printing--.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 6-8, 13-15, and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirose (US6407345) in view of Stopperan (US5719749) and Ishikawa (US5243142).

9. **Regarding claims 6, 13, and 26**, Hirose discloses drilling through-holes (36, Fig. 1B) in a substrate and performing electroless plating to plate the inside of the holes and the substrate (see step (1) in col. 15), etching a strip conductor image into the plated layer (34, Fig. 1C; see step (1) in col. 15), filling the holes with a medium in the form of a lacquer (see thermosetting resin filling agent 40, Figs. 2E-2G; see step (4) in col. 15), lacquering the surfaces of the substrate (see Fig. 2H; see step (8) in col. 16) and applying an insulating lacquer (44, 46, 50, Fig. 2H) to the surfaces of the circuit board, and producing strip conductors (54, Figs. 4N and 4O; see steps (13) and (14) in col. 17) arranged above the through-connections.

10. With respect to the limitation "wherein the through-bores are approximately 20 μm in size", it would have been obvious to one of ordinary skill in the art to apply the method of Hirose to through-holes of the claimed size, depending on the particular design of the circuit, since the process steps are the same irrespective of the through hole diameter. Hirose forms through holes with a radius of at least 125 μm , because it is difficult to form smaller holes by a drill. However, simply because Hirose was unable to drill smaller holes does not mean the process cannot be used with smaller through holes.

11. Stopperan shows that it is known in circuit board manufacturing to form through holes via laser drilling, which allows for holes smaller than 25 microns (i.e. approximately 20 microns; see col. 6, Ins. 11-13).

12. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to utilize the process of Hirose with substrates having holes of

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the claimed diameter, in view of the teachings of Stopperan, since the process of Hirose is not limited to the size of through holes disclosed by Hirose, but, rather, the process can be used with through holes of other sizes, including as claimed, and Stopperan demonstrates the physical limitation discussed by Hirose has been overcome in the art.

13. Regarding the newly added limitation, see the above rejections under 35 U.S.C. 112. Hirose and Stopperan disclose the same invention as the Applicant, except for the filling of the through connections being performed by means of screen printing.

14. Ishikawa shows that it is known to fill through holes with a material by means of screen printing (see Example 2 in col. 5, especially lns. 30-34 in col. 5).

15. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to utilize screen printing in filling the through holes in Hirose and Stopperan, for the same advantages as when used conventionally in the art.

16. **Regarding claims 7 and 14**, Hirose, Stopperan, and Ishikawa together disclose substantially the same invention as the Applicant, except for the medium used to fill the holes and the insulating lacquer being identical.

17. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to choose a medium and a lacquer suitable for the intended use, since this requires only routine skill in the art. As such, it would have been obvious for one of ordinary skill in the art to utilize the same material for the medium and the lacquer, if such a suitable material exists, because it is more economical to utilize a single material than to utilize two different materials.

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18. **Regarding claims 8 and 15**, the lacquer is inherently non-resistant to etching, since there must exist some sort of etching process which will etch the lacquer, be it a chemical etching process or a physical etching process.

19. **Regarding claims 13**, the lacquering is performed without brushing the electrically conductive general layer of the circuit board.

20. **Claims 9, 10, 12, 16, 17, and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirose, Stopperan, and Ishikawa, as applied above, in view of APA (Applicant's admitted prior art).

21. Hirose, Stopperan, and Ishikawa together disclose substantially the same invention as the Applicant, except for the strip conductors being carbon, individual circuit boards being separated by milling, and the insulating lacquer being an International Standard Organization lacquer.

22. APA teaches that it is known to form carbon circuit patterns (step 8, page 5), to separate individual circuit boards by means of a milling process (step 10, page 5), as well as to use an ISO insulating lacquer (step 7, page 4) in manufacturing printed circuit boards.

23. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to apply these concepts in making the circuit board of Hirose, Stopperan, and Ishikawa, for the same advantages as when used in the prior art of APA.

Response to Arguments

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24. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIVIUS R. CAZAN whose telephone number is (571) 272-8032. The examiner can normally be reached on M-F 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DERRIS H. BANKS can be reached on (571) 272-4419. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. Dexter Tugbang/
Primary Examiner
Art Unit 3729

/L. R. C./ 2/4/2010
Examiner, Art Unit 3729